

## **ISTEP+ Performance Level Descriptors**

### **Mathematics – Grade 8**

#### **Grade 8**

##### **Pass+**

*Pass+* students demonstrate advanced mathematical and problem-solving skills. Students solve complex problems with rational numbers, ratios, proportions, percents, square roots, exponents, scientific notation, and the Pythagorean Theorem, and demonstrate expertise in the areas of geometry, measurement, and data analysis and probability. *Pass+* students display highly developed skills with algebra concepts, including writing and solving equations and inequalities. *Pass+* students solve sophisticated problems, support their solutions, and generalize the results to other situations.

Examples of specific knowledge, skills, and abilities for Grade 8 students scoring at the *Pass+* level include:

- Solve complex problems involving rational numbers, percents (i.e., compound and simple interest), scientific notation, ratios, proportions, and positive and negative exponents
- Write and solve equations and inequalities
- Evaluate algebraic expressions with powers
- Solve problems involving slope and rates of change
- Represent linear and quadratic functions in multiple representations (i.e., tables, equations, verbal expressions, graphs, and formulas)
- Solve systems of equations
- Solve problems involving rates, area, volume, velocity, density, the Pythagorean Theorem, and transformations (translations, rotations, and reflections) of objects and shapes
- Organize, analyze, and interpret data in multiple representations
- Find the number of possible arrangements of several objects
- Analyze strengths and weaknesses for different methods of collecting data, and determine any bias in a sample
- Understand and recognize equally likely events
- Analyze and solve problems by sequencing, prioritizing, and identifying relevant information; breaking complex problems into simpler ones; using words and symbols to support solutions; using simpler problems to solve more difficult ones; drawing mathematical conclusions; and determining the reasonableness of solutions

#### **Grade 8**

##### **Pass**

*Pass* students demonstrate proficient mathematical and problem-solving skills. Students are capable of solving problems with rational numbers, ratios, proportions, percents, square roots, positive exponents, scientific notation, and they are competent in the areas of geometry, measurement, and data analysis and probability. *Pass* students are skilled with algebra concepts, such as writing and solving equations. *Pass* students experience success when solving problems, communicating ideas, and applying mathematical knowledge to a variety of situations.

Examples of specific knowledge, skills, and abilities for Grade 8 students scoring at the *Pass* level include:

- Solve problems involving rational numbers, percents (i.e. simple interest), scientific notation, ratios, proportions, and positive exponents
- Write and solve equations
- Evaluate algebraic expressions with powers
- Represent linear functions in multiple representations (i.e., tables, equations, verbal expressions, graphs, and formulas)
- Solve problems involving rates, area, volume, the Pythagorean Theorem, and transformations (translations, rotations, and reflections) of objects and shapes
- Organize, analyze, and interpret data in multiple representations
- Find the number of possible arrangements of several objects
- Solve problems by breaking complex problems into simpler ones; identifying relevant information; using a variety of strategies; using words and symbols to support solutions; using simpler problems to solve more difficult ones; and determining the reasonableness of solutions

## **Grade 8**

### **Did Not Pass**

*Did Not Pass* students demonstrate limited mathematical and problem-solving skills. Students may have difficulty when solving problems with rational numbers, ratios, proportions, percents, square roots, exponents, and scientific notation, and the complexity of algebra may be an obstacle for *Did Not Pass* students. Also, math topics including geometry, measurement, and data analysis and probability can be a stumbling block for students. *Did Not Pass* students may have difficulty making decisions about how to approach problem-solving situations, how to communicate their ideas, and how to apply mathematical knowledge to other situations.

Examples of specific knowledge, skills, and abilities for Grade 8 students scoring at the *Did Not Pass* level include:

- Solve basic problems involving fractions, decimals, square roots, and scientific notation.
- Identify lines with positive and negative slope
- Perform translations of objects and shapes
- Find area and perimeter of 2 dimensional shapes
- Organize data in simple bar, line, and circle graphs, and interpret basic information from data, such as maximum and minimum values
- Solve problems by identifying relevant information in problems; using different strategies; making calculation; and determining the reasonableness of solutions